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DISTRIBUTION OF ORGANIC POLLUTANTS IN BIOTA FROM THE BELGIAN NORTH SEA AND THE SCHELDT ESTUARY

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The Western Scheldt Estuary (SE) is subjected to a wide variety of pollution sources with persistent organic compounds: chemical factories, the Antwerp harbour and industry located further upstream of Antwerp. Various benthic invertebrates (flying crab, common shrimp, and red starfish), small fish (sand goby), benthic flatfish (dab, plaice, and sole) and gadoids (bib and whiting) were collected in the Belgian North Sea (BNS) and along the SE. These two areas are impacted to different degrees by various organic contaminants, such as polychlorinated biphenyls (PCBs), organochlorine pesticides (OCPs), polybrominated diphenyl ethers (PBDEs).

Levels of 25 PCBs, 8 PBDEs and 15 OCPs found in the SE samples were significantly higher (up to 30 times) in the SE compared to the BNS. For most species, a inverse correlation was found between the concentration of contaminants and the proximity to Antwerp, pointing at a higher degree of exposure further upstream. PCBs were the major contaminant in all species, while PBDEs were surprisingly found at similar levels with PCBs. The highest concentrations, up to 3000 ng/g wet weight, were measured in liver of fish species (bib, plaice and sole) collected from the SE. The presence of PBDEs in such high concentrations in the SE may be attributed to a brominated flame retardant manufacturing plant in Terneuzen, to discharges in the Antwerp harbour, and/or to their present use in textile industry located further upstream the river and tributaries. Differences in contaminant concentrations and profiles were attributed to different exposure and to species-differences in metabolism. Some species, such as dab, plaice bib and whiting, showed a preferential accumulation of contaminants in the liver.

In order to assess the biomagnification potential of these contaminants in the aquatic food web, liver samples from harbour porpoises (Phocoena phocoena) stranded between 1997 and 2000 on the BNS coast were also analysed. PCBs were by far the most important organohalogenated contaminants with a relatively wide range of concentrations (up to 400 μg/g lipid weight), suggesting a high biomagnification potential of contaminants from fish to porpoises. PBDEs and methyl sulfone metabolites of polychlorinated biphenyls (MeSO2-PCBs) were also important contaminants (up to 5.8 and 4.2 μg/g lipid weight), followed by DDTs and other OCPs. Due to biomagnification, concentrations of PCBs, DDTs, MeSO2-PCBs and PBDEs were significantly higher in the adult group (n=8) than in the juveniles (n=13). Concentrations of PCBs, DDTs and PBDEs were significantly higher in males (n=15) than in females (n=6), probably due to a loss of contaminant load for females through gestation and lactation.

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